

## A Geneticist Looks at Contraception and Abortion

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THE PAST 15 or 20 years have seen the transmutation of genetics into biochemistry and the emergence of a new science of molecular biology. This discipline has greatly illuminated some of the most fundamental issues of human nature. It inevitably raises questions for that time when we modify the genotypes of human beings by principles already commonplace in the experimental genetics of microorganisms.

Originally it had been my intention to discourse on these questions to contemplate how we might be able to cope with the issues that this awful knowledge which man has acquired might bring us. But in contemplating how I might discuss molecular human biology, it occurred to me that to dally on such questions would be an amus-

ing and engaging futuristic escapism. We might then have to chide ourselves for using these issues to avoid facing up to some very cogent and very present problems about which physicians and biological scientists are still not sufficiently outspoken \* and which result in an untold amount of human misery. And further, unless we are able to deal with these contemporary issues in a humane way, we will never in the future be able to cope with the subtler problems of qualitative intervention in the finer points of human reproduction.

We have been through an era in which mystical conceptions of human nature have discouraged the distribution of information about contraception and family planning. The earth is laid open to an unprecedented crisis of misery because of the reticence 20 or 30 years ago of many informed individuals to speak out soon enough, vigorously enough, demandingly enough to reach the position and policy we take with respect to family planning today.

I would like to remind you that not very many years ago "contraception" was a dirty word; it was impossible to refer to contraceptive devices in public media. Yet I don't have to remind this audience what the total, miserable consequences of the delay in the imparting of knowledge of quantitative control of conception have meant and mean now throughout the world. It is even possible that the world will not survive as a habitat of the human species simply because of our reticence, because of our pusillanimity, in coming to face an issue about which every one of us here has long had all of the moral and biological facts.

\* This material was presented before the AMA's endorsement of abortion-law reform.

Now we are approaching an era of reasonable policy with respect to family planning; contraception is no longer a dirty word or a furtive action. It is even respectable for the President of the United States to refer to it as an issue of public and social policy. These advances may barely rescue some part of the situation but only with extraordinary efforts in food production and economic adjustment to cope with the population pulse.

The next issue of this kind is, I believe, in a state of transition quite comparable to the biomedical approaches to questions of family planning of 20 years ago. I refer now to voluntary abortion. I believe all of you are acquainted with the legislative crises that are cropping up throughout the country over attempts to reform the savage laws that now concern this practice. As you know, there are at least 1 million unsanctioned abortions in this country each year at the present time. I am still dumbstruck that we countenance such a bootleg system, a facility available particularly to the well-to-do, the sophisticated, the well-informed, whereby they are able to evade the law, and the hypocrisy of the law, in dealing with this issue. This hypocrisy lies in the fact that doctors are sporadically brought to the bar of justice for the admitted practice of abortion and in the medical hazards and the psychological strains that are so unfairly imposed on so many women in consequence of the present status of the law on this question. We do need the most controversial discussion of the law of gestation from the standpoint of public policy. This is not a simple issue. The consequences of drastic reforms of the law on this subject need to be very thoroughly worked out from the point of view of their impact on the quality of life of the community.

I do protest, however, against allusions to the absolute right of the life of the unborn (which implies some absolutely unique quality of the fertilized egg compared to other tissues) and that this point is abso-

lutely definable as the start of human life. In fact, all of our fundamental knowledge of the main roots of biology, evolution, and development processes opposes this catastrophic theory of human personality. The question "When does life begin?" is held to be a premise for a legal construction about when it is permissible to interrupt the process of development. There can be no answer to this question separate from the purposes for which the question is raised; you will get back exactly the answer you had already prejudged.

For life is a continuum; if life had a beginning at all, it was an event that occurred some 3 billion years ago. About this we must be quite vague, lacking a precise definition to separate the first living macromolecules from the inorganic molecules that led to them. Since the establishment of effective deoxyribonucleic acid (DNA) molecules, there has been a continuous transmission of the spark of life from cell to cell, from DNA molecule to DNA molecule, with gradual changes during the evolutionary process. No more than a small percent of the total nucleotide composition of the diploid human nucleus differentiates the human being from the ape, or the monkey, or other primate species. During the evolution of the species there was no sudden emergence of human personality but the gradual accumulation of those genetic alterations controlling the development of the brain that in turn permit the development of humanity.

We see the same process during development: The fetus is by no measurable criterion nearer to being a human being than the unborn ape or chick. Even the newborn infant must undergo further development to achieve the full measure of humanity. An operationally useful point of divergence of the developing organism would be at approximately the first year of life, when the human infant continues his intellectual development, proceeds to the acquisition of language, and then par-

ticipates in a meaningful, cognitive interaction with his mother and with the rest of society. At this point only does he enter into the cultural tradition that has been the special attribute of man by which he is set apart from the rest of the species. I do not advocate a discussion of infanticide—a special intervention in the period between the delivery of the infant and the time at which he acquires language. We are all so emotionally involved with infants that this is in itself enough to create an inevitable and a pragmatically useful dividing line. To discuss the fetus during prenatal life as if he were a human being is merely to reflect the emotional involvement of that observer, according to a set of tastes not now shared by the majority. This should not be confused with any objective biological standard by which we can set up principles of social order as criteria for the operation of the law.

If there were not such enormous inhumanity involved in the persistence of traditional points of view on this question, there might be little point in raising this issue. Tradition has to be given great weight. We have a reasonably successful social order based on our conceptions of the dignity of human life, and we must be extremely cautious about interfering with these. But I believe that the lay public is still not adequately aware of the facts and that the medical profession has simply not faced up adequately to the facts of which it is aware—that is, the hypocrisy that is rampant in the actual exercise of abortion in defiance of outdated law for a small, privileged segment of our population. I, therefore, submit it to you as a matter of conscience to help put this issue on the plane where it deserves to be discussed: What are the realistic consequences of revision of the law for human welfare in the light of your own knowledge of the con-

tinuity of biological development and evolution.

The conditions of modern life are paradoxical: By sustaining impaired bodies medicine contributes to the postponement of the genetic load—the homage that must eventually be paid to natural selection as a means of eliminating deleterious mutations from the species. Natural selection can be a personal disaster if it entails the premature death or the incapacitation of a child or young adult. But differential mortality is merely the most grievous, not the most effective, avenue of constructive selection. Differential fertility is perhaps the most innocuous, and contraception must play an important part of genetic policy here. When, however, a grossly impaired infant can be anticipated, genetic concerns for the health of the species concur with compassion for the mother and the other members of the family in supporting the need to make voluntary abortion available. New findings on the biological study of the early fetus open the way to the appropriate diagnostic tests and will surely play a large part in the rational control of human reproduction.

Far from limiting efforts to have children, the availability of voluntary abortion should go a long way to encourage the gamble in risky matings, by putting the stakes under more effective anticipation. Such a policy represents the only humane reconciliation of the individual's rights of parenthood and social concern for the containment of genetic disease.

#### REFERENCES

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## Discussion (i)

*Medical ethics and etiquette—experimentation on humans—Federal clearance of drugs—self-experimentation—informed consent and legal liability—stimulation of intelligence—"intellectual" drugs versus "mood" drugs—monstrous births and infanticide—genetic danger of nuclear testing—relaxation of natural selection—prisoners as experimental subjects.*

DR. LEAKE: NOW I come to the questions. I will try to keep one for each panelist as I go down the line unless we get into some kind of an argument, but I don't think we will.

DR. McDERMOTT: I must say that in preparing for this Colloquium I had occasion to read all those Declarations as well as the Hippocratic Oath. I was vastly entertained to see that "first things are first" in the Hippocratic Oath in that the first part of it has nothing to do with the patient at all; it has to do entirely with the relationships of physicians to each other.

DR. LEAKE: It is important, I think, that we always make sure that we make the distinction between medical etiquette—the subject of the older principles of medical ethics—and the fundamental moral problems with which the public is concerned. We will turn, then, to Dr. Stumpf and his interesting discussion. The point that I'm raising here is in regard to the experimentation that he mentioned; he brought up the point that it is not possible to predict from animal experimentation what drugs will do in humans. Well, I've been working in this field for a long while, and my own feeling is that we can get a pretty good idea. But when it comes to experimentation on humans, I could ask, Isn't a therapeutic procedure of any sort undertaken by any physician on any patient a form of experimentation in the sense that we can never predict absolutely what the outcome of the therapeutic procedure may be?

PROF. STUMPF: I agree that there is a distinction between a patient and a subject, and I agree with your point that a physician almost always is experimenting with a drug in relation to the particular patient. But the difference is that a physician is experimenting on the *patient* with a drug that has been cleared, whereas (and this is the point that I have been raising) the *subject* is being subjected to a trial with something that has not been cleared. It may be that novel chemicals and drugs are used also in therapy, but the big distinction, I take it, is that, even in the case of using a drug that has not been thoroughly tested, the justification for it is the possible good it will do *this* patient in the context of a problem; whereas, when you give it to a *subject*, there is the question as to whether the possible side effects can justify its use.

DR. LEAKE: You have brought up a point, namely, whether the drug has been cleared. It is my opinion that judgment with regard to the use of any chemical agent for any purpose in medicine should be made by members of the qualified health professions and not by a group of bureaucrats. When we talk about clearance, I realize of course that it is necessary to have some consensus of judgment, but I believe that that consensus of judgment should be from the health professions.

PROF. STUMPF: I'm not aware that people who are unqualified are making judgments with respect to clearance. Now, I speak obviously as a philosopher who spends most

of his time in a very delightful ivory tower, but the logic of it is rather clear. Two things have to be said here, and I don't mean it to come out quite as abrasively as it will. In the first place, I'm not sure there would have had to be a bureaucracy if the issues hadn't provoked it; and, in the second place, I have a feeling that Dr. Goddard \* is, in fact, a doctor.

DR. LEAKE: He is, and he is an excellent man. But he is attempting, in my opinion, to regulate what I believe is an unsatisfactory law or statute for this reason: that the law or statute implies that there is an absolute effectiveness or an absolute safety to every drug. There is no such thing.

PROF. STUMPF: No, but the implicit drift of your argument would be that there should be no controlling of any kind; and I don't think anyone in this room would want that.

DR. LEAKE: No, I didn't say that. I acknowledged the necessity for social control.

PROF. STUMPF: Well, then, the goodness or the badness of it is yet a different question, but I think the issue that you have raised is whether there really should be technical organized supervision of this very delicate matter.

DR. LEAKE: And that is what I have advocated that it be—through the members of the health professions. The AMA abrogated their rights in the matter.

PROF. STUMPF: Are you suggesting that the government, as the government, ought not to have anything to do with this even though the government bureaucracy is staffed by physicians?

DR. LEAKE: No.

PROF. STUMPF: Then what is the issue?

DR. LEAKE: I feel that there is a reasonable way in between where it can be worked out without the difficulties that are arising now, especially in experimentation. But let

me go on, if I may. How about self-experimentation.

PROF. STUMPF: That's a rather interesting thing in that the only code that I know of that touches on this is, to the best of my recollection, the Helsinki Declaration in which it says—I think in Section 5—that certain very dangerous experiments ought not to be undertaken except in those cases where the experimenter himself is the subject.

DR. LEAKE: Remember, I tried to point out this is my own field, and, when one is dealing with chemicals for the first time, there is always a danger. I've had a lot of experience in this. In our laboratories out here we developed five useful drugs: divinyl ether for anesthesia, carbarsone for amebiasis, Vioform® (iodochlorhydroxyquinoline) for amebiasis and bacterial enteritis, the amphetamines, and nalorphine, the antagonist to morphine. In each case, no one of those drugs was ever used on anyone else first—on ourselves always. And I might say that in the experimentation in our laboratory we have kept from coming to any use on any other human being except ourselves those drugs that did show in ourselves undesirable effects. I think self-experimentation is pertinent for those who are going to develop a new drug. Now to go on with my questioning. Turning to Judge Burger, may I ask a question that I think is of importance to all of us. What is the real significance of consent—whether informed or not? My point is this: Does consent absolve the clinical experimenter from liability for malpractice or for injury to either his subject or his patient?

JUDGE BURGER: I know from talking to medical groups in the past and from long and intimate association with a great many members of the profession that it will never be possible for lawyers to explain really what informed consent means to doctors because it is a concept like that of the hypothetical "reasonable man." That makes it difficult. The consent problem in experi-

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mental medicine, I would think, is not fundamentally different from the consent problem that the astronauts have with the U. S. Government. They're engaged in an enormous experiment, and recent events have shown how dangerous; the recent three deaths were ones that apparently were unpredictable. Yet it's clear that these men knew the risk they were assuming, and that essentially settles the matter. If we could be clear on the disclosure, if the disclosure never holds back, and if it is articulated adequately, then the problem can be solved.

DR. LEAKE: Yes, but you haven't answered my question. Does the consent absolve the experimenter from liability?

JUDGE BURGER: Well, I think what you're really saying is, does it prevent someone from suing you? The answer is no; nothing ever prevents anybody from suing you.

DR. LEAKE: I just wanted to make that clear, because a lot of physicians and a lot of hospitals think that once they have a consent signed by a patient everything is in order and they are not going to be sued; and they are surprised when they are.

JUDGE BURGER: This is a common attitude in the medical profession. But let me emphasize that there is nothing to prevent some of the ladies in the audience from suing anyone of us for breach of promise if we've smiled at them during the course of this session. You can always sue, but the adequately obtained consent with informed judgment—with the disclosure factor—will generally be an adequate defense in most of those situations.

DR. LEAKE: The point is that we should do everything we can to promote mutual trust and mutual confidence.

JUDGE BURGER: Right.

DR. LEAKE: This, then, is a matter of extreme importance in interpersonal relations. I wish to turn now to Prof. Krech, if I may. He had a wonderful appeal to the hippy mystique, it seems to me. I think it's important to consider this enriched psychological environment. We are certainly

in a tension-filled world. This does bring up plenty of problems. We all should get brains that will expand all over with this psychologically enriched environment that we're getting into. But I am interested in particular in some of the experiments that were quoted. I know something about experiments of this sort with rats and mice in maze learning. We did a lot of it when we were studying the amphetamines which are central nervous system stimulants, as are pentylenetetrazol and caffeine. The central nervous system-stimulating effects of many of these drugs have been studied quite exhaustively. I frequently used to tell my students, Certainly, caffeine is a central nervous system stimulant; it will promote association of ideas, but there is no guarantee that this association is ever more correct or accurate than that due to chance. One can say that coffee or caffeine tends to promote a diarrhea of words and a constipation of ideas. Now, when we were studying the amphetamines, we used pentylenetetrazol as controls, and we could find no significant increase in rate of maze learning either with pentylenetetrazol or with amphetamines or caffeine. All that I am pointing out is that one can use all sorts of experiments, but one must evaluate those experiments. As has been brought out very clearly in this discussion, what applies at an animal level can be carried over to the human level only with careful consideration.

DR. KRECH: I venture to take the risk. I agree that man—and his brain—is bigger and perhaps even better than a mouse. The experiments that I cited were just two of McGaugh's experiments—only two out of a whole series of about 10 years of experimentation over a whole range of drugs. But, despite his very positive and very exciting results (and, of the controls that you indicated should be taken, many have been taken), despite all the progress, I suspect that we are still in the Stone Age of this kind of experimentation. Add to that all

the experimentation on the deleterious effects of inhibitors of protein synthesis, the ribonucleic acid (RNA) experiments, and so on, and I think you can't avoid the feeling that we are close to the verge of an important breakthrough (awful word!). I just want to try to anticipate what we're going to do when the breakthrough comes. I know that already several of the pharmaceutical houses have on clinical trial a number of drugs intended to speed up or facilitate memory. These trials are being made on patients who are mentally retarded or senile. What the results will be, no one knows. But I would not bet against the project.

DR. LEAKE: This is all very important. In general, insofar as the central nervous system is concerned, it is much easier to find chemical agents that will inhibit in one way or another the activity of the central nervous system than ones that will improve or accelerate its activity. But very recently, as you know, magnesium pemoline was introduced by a former student of mine for the purpose of increasing RNA formation. It works, apparently, in experimental animals; it has been tried in humans, not too satisfactorily.

DR. KRECH: It doesn't work too satisfactorily in animals either. I might make just one point here. I find in general that physicians are familiar with mood drugs—they have been on the front pages. Physicians are not familiar with what might be termed "intellectual" drugs, and most of the exciting experimental work that is going on (as far as I am concerned) is with intellectual drugs. Now, it is important to understand that, to evaluate the significance of the current work with these drugs, one has to be sophisticated about psychology and behavioral measurement as well as about pharmacology. And I regret to say that most physicians and most pharmacologists are naive and ignorant about the sciences of behavior.

DR. LEAKE: Surely I will admit all this, but I also want to remind you that I did emphasize the distinction between mood and behavior; nothing exemplifies it more fully than the attitude or the way in which our hippies go about—their mood is exalted and wonderful; you can judge their behavior.

DR. McDERMOTT: I gather that Dr. Krech has made the point that he likes it when the investigator is at least as smart as the drug.

DR. KRECH: By the way, we seem to be of the happy opinion that we can't do any self-experimentation on mental retardates!

DR. LEAKE: No. Speak for yourself, Dr. Krech; I can't.

DR. McDERMOTT: Order!

DR. LEAKE: Now I'd like to ask Dr. Lederberg an important question. This has to do with the matter of voluntary abortion and the right to die. Let me ask, Is infanticide justified in the case of monstrous birth?

DR. LEDERBERG: What I spoke to was not a moral judgment about the consequences of reforms in our law or in our attitude but to plead that they be examined in terms other than so-called "absolutes" with respect to the objects in question. The question of whether infanticide is morally justified, I think, can only be answered by an inquiry as to the consequences of the introduction of this practice into contemporary society. I think it is possibly true—and this is the point that I believe should be debated—that to make it easier to kill a live-born infant may knock down other important barriers to misbehavior on the part of our population. I think that before I would advocate killing even monstrous births, I would want to inquire what the effect might be on the standards of care of other infants, on the attitude towards child beating, and so forth. I hope I did not leave the impression that I regarded our traditional attitudes or our traditions of care for human life in any casual fashion.

DR. LEAKE: No, not at all. I was not quite correct, perhaps, in emphasizing the positive aspect of infanticide. But how about letting the monstrous birth die? In other words, how about making no positive effort to keep it alive? That also is a moral problem.

DR. LEDERBERG: I can only express now a judgment that is personal and one that I would not advocate strongly but that might provide the point of departure for a discussion of the issue rather than a conclusive statement. This would be that I would very much prefer that we anticipate as many of these events as possible, that we improve our scientific technique for prenatal identification of monstrosities, that we do as much as we can to bring about the earliest possible detection of aberrations so that these genetic deaths can be made to occur at that period where they would have the least strenuous consequences for the other members of our society. That would still leave some monsters that are not detected before birth; my inclination with respect to them is that they may be such interesting objects for humane observation and experimentation that it may very well be worth making very great efforts to keep them alive once they have started to exist. But I think that one ought to do more than just lock them up in a warehouse or inflict them on an unfortunate family that doesn't know how to keep them or how to deal with them. They ought to be regarded as exactly what you've described—monsters—careful study and observation of whom under the most humane conditions could teach us more about human nature. We have not taken this approach.

DR. LEAKE: Could I ask you one more question? What actually is the genetic danger of nuclear energy? We've had a lot of conflicting statements recently.

DR. LEDERBERG: Well, I don't think there is much conflict about the facts despite the

complexity of the subject. The issue that was raised 10 years ago was that, if nuclear testing into the atmosphere were to continue at the existing rate, there would be a gradual accumulation of radioactive effects on genetic material that would begin to match to a considerable percentage the already existing load. There is already an existing background of spontaneous mutation of essentially unavoidable exposure to cosmic rays and disintegration of potassium-40 in granite and so on, and this has been used as a commonsense measure of potential hazard. The existing pattern of fallout at that time, I believe, was calculated to be approximately 10% of the natural background of genetic effect. I believe it true that we would like to minimize this to the least possible value, and a 10% increase over the preexisting background would have begun to reach the level that I think we would not want to see continue and certainly not to increase. On the other hand, I would also point out that there are many, many measures that we could contemplate taking, or to which research could be directed, that might be expected to have the effect of reducing the background rate of mutation due to thermal and chemical mutagens. So, on the one hand, I would not be frantic about attempting to vary the background incidence of mutation within that realm of some few percent, but, on the other hand, I would be alarmed if there were any great increase—as indeed might have happened if atmospheric testing of nuclear weapons had continued to have increased.

DR. McDERMOTT: Dr. Leake, I'm very anxious to get Dr. Dubos into the fray. I wonder if you could approach Prof. Medawar and Dr. Starzl at this time.

DR. LEAKE: Sir Peter, in connection with the relaxation of natural selection to which you referred, do you think that this will occur even in the face of the increased tensions of our overcrowded planet?



SIR PETER MEDAWAR: I don't quite understand that question. I referred to the relaxation of natural selection in the context of preserving the genetically unfit, those people who are genetically obliged to live in more restricted worlds than the majority of us. What I mean by the relaxation of natural selection is the preservation of life and the propagation of genes in people and by people who would otherwise have died. I think that this is a purely technical point; nothing very emotive turns on it.

DR. LEAKE: Finally, I will ask Dr. Starzl a question in connection with the matter of choice of subjects for human experimentation and the use of prisoners or soldiers or other people of that sort. Now, we don't want to coerce anyone to become a human subject for experimentation. But supposing the individual volunteers and honestly volunteers? Isn't he more or less in the same position as the medic at the battlefield who volunteers to go out after the wounded on the battlefield? I don't think that the prisoner who may volunteer honestly and fully should be denied the opportunity to serve the rest of us; he may be wishing to compensate. I remind you that in Walter Reed's studies on yellow fever death did occur—as it did later with Stokes and Noguchi. These were volunteers, but they also were self-experimenters. I've worked on prison volunteers—actual volunteers—at Ohio where the prisoners asked if they could be permitted to serve as subjects in

testing new drugs. They came to us; we didn't go to them.

DR. STARZL: I didn't mean to suggest that we had ever used a penal donor who was not to our advance knowledge a legitimate volunteer. I think they were all strongly motivated, most for the very high-minded social reasons you have suggested. We know for certain that there were certain others or at least one other who was proved to be motivated by the thought that he would be able to more easily escape from the hospital than from the prison. This, in fact, he did. I think that the problem is not that there aren't legitimate volunteers in prisons but that in the absence of their civil liberties they might not be *really* free to make a choice. I think a 16-year-old minor who donates a kidney to his identical twin also probably wants to do so, but he does not have the requisite legal protection to be able to make his decision freely. I think we made a mistake in accepting prison volunteers, and I suspect that you probably did so also when you were in Ohio.

DR. LEAKE: No, I deny that; we did pretty well on it, and I think the prisoners enjoyed it. But, Mr. Chairman, might I take the opportunity here to thank the members of the panel for responding so directly and so clearly to these nasty questions that I have raised. The panel is an excellent one.

DR. McDERMOTT: And may we thank you. We will now turn to Dr. Dubos for his challenge.

## Discussion (ii)

*Permanency of moral values questioned—change of attitudes with time—social control of research—speeding up the law by educating the public—individual conscience in research versus social control—extension of education to influence intelligence—hazards of drugs for intelligence—pay and insurance for experimental volunteers—doctrine of assumption of risk—social determination of the individual conscience—the researcher's social responsibilities—care for quality of human life, the permanent moral value—some wisdom from outside science—individual versus statistical morality, an artificial distinction—three permanent values—absolute versus absolute inferences—the application of traditional, immemorial morality—summing up.*

**D**R. McDERMOTT: Thank you, Dr. Dubos. Would any members of the panel like to volunteer to start attacking the morals of each other or of our community? Prof. Medawar, do you have a question that you wish to ask?

**SIR PETER MEDAWAR:** I would like to say, if I may, just by way of starting off the discussion, how very much I agree with Dr. Dubos's questioning the permanency of moral values. We tend to strike moral attitudes that are actually obsolete or are out of date in relation to what we actually believe at the time. I'd like to give you an example of such a change of attitude. The question of the justifiability of abortion is not a scientific question, but it is a question to which scientific evidence is highly relevant, and, as the scientific evidence enlarges, so in fact do our opinions change. For example, a hundred years ago it would have been perfectly reasonable for a married couple to think that the child they conceived on any one occasion was a unique and necessary product of that occasion. That is to say, they would necessarily have the child they actually did have, if they had a child at all. And the child himself

is apt to believe this automatically. A child does sometimes say, rather wonderingly, that if his mother and father had never chanced to meet and fall in love and marry then he himself would never have existed. He does, however, take it for granted that, as they did in fact meet and fall in love and marry, they necessarily had him—him uniquely and distinctively. One of the things that has changed is the realization from Mendelian principles that the actual child conceived on any one occasion is one of a million possible children who might perfectly well have been conceived on that occasion if the luck of meeting of sperm and egg had been otherwise: So the child actually conceived by any one occasion is conceived as a matter of luck. Sometimes it is cruelly bad luck: A phenylketonuric (PKU) child may be born in the 25% of cases that would be expected if PKU heterozygotes marry. Why should we be victimized by this process of luck? We now have a new understanding of the process of conception and the way in which luck enters into it. Why should we regard ourselves as morally bound by the laws of chance to put up with the birth, let us

say, of a monstrous child if there were some humane and sensible way of preventing such a thing occurring? Our attitudes have changed.

PROF. KRECH: I would like to speak to another of Dr. Dubos's comments. I wonder if we all realize how radical one of his suggestions is. It is to this effect: that the choice of our research problems—not only biomedical but all basic research—is no longer to be determined by the interests and preferences of the research worker alone. Rather, this choice is to be controlled by social needs, social priorities, or social values. And this, for many research workers, does represent a radical reorganization of thinking. I happen to agree with you, Dr. Dubos, so I am proud to be associated with you in this revolutionary position. But it is a revolutionary position and one to which I think researchers would object—vigorously and violently—raising against us the old standards of “freedom” of research.

JUDGE BURGER: I have a feeling that the medical profession has had a tendency to overreact to some of the fears about law and lawyers and judges and juries. Admittedly, they have something of a problem as to juries because they are unpredictable. But the fact is that over the years, as was pointed out, our progress in the law is not so terribly glacial at that. I was perhaps overstating its slowness. But I also countered by pointing to the changes in attitudes, and another one comes to mind. A hundred years ago the dissection of human bodies was forbidden in many places. That's all gone; it's part of mythology now. A decision of our court recently has made the world safe for the town drunk: He may no longer be arrested, because it is not a crime to be a chronic alcoholic. He has to be picked up and put away, but he cannot be prosecuted and put in jail. Probably in due course the same thing is going to happen with narcotics addiction. Only within the last 18 months Congress has passed an

enormously significant piece of legislation calling for the treatment—compulsory treatment to be sure—but treatment as an alternative to imprisonment, of narcotics addicts. All I intended to point out was that the law cannot lead these things. It can only respond. You must lead them, and you must take your case to the public, either directly or through articulate lay people who can argue your case for you. And when you do, I think the consensus of the people in this country will respond. Just as your medical research has had this fantastic rate of speed in the last 20 years more or less, you have forced the law to speed up. You have brought about swifter changes in public opinion; and public opinion, in turn, is what leads congressmen and senators to act. So I would not be disheartened, and I would think that the medical investigators perhaps should lose some of the fears they have about going ahead just so long as the medical profession is prepared to control and denounce the irresponsible investigator and the irresponsible kinds of things that occurred in some of the disasters that I mentioned.

DR. LEDERBERG: At Dr. Krech's request, I will add a point to the one I was previously going to make and will comment on what he said. I didn't take Dr. Krech's remark as implying a large degree of social control of research; he was appealing to the social conscience of the individual investigator that he, the investigator, perhaps pay more attention to the requirements of his community in whatever way he could find it within himself to do. And this I heartily applaud. If Dr. Krech was stating that he agreed with the principle of social control of research—which I think he was saying—I would want to express my vehement disapproval. I would regard this as an utter disaster and one from exactly the point of view of attempting to reach the same aims that he has in mind. The implication that social control or any rigorous effort to re-

discipline research should be vested in regulatory bodies such as the Councils of the National Institutes of Health would require a concentration of social wisdom in a few individuals in exactly the area where we can least expect it in terms of innovation and creativity.\* No one else can possibly know what ideas I might have if I am left to the freedom of my own choice of investigation in an area whose social consequences are not yet apparent. In this matter I think there is an enormous distinction between an appeal to conscience and an imposition of control. (Applause.) I am beginning to wonder what was wrong in what I have said.

I shared Dr. Krech's amusement in the parlor game "what if" as applied to the expected appearance of chemical innovations in the development of intelligence. And by the way, I fully agreed both with his expectations of the occurrence of a breakthrough in this area and with his statement of the time scale on which it is likely to occur (assuming that psychologists do learn some of the tricks of proper behavioral control in the conduct of their experiments). My only riposte is that the change in availability of higher education is a social experiment that I believe to be strictly analogous to what he suggests may come about with the availability of chemicals to influence intelligence. Until rather recently, higher education was a resource open only to a strictly limited segment of the population—the economically affluent. Its availability to a wider variety of social groups and different countries represents exactly the kind of experiment that he was postulating would come from the introduction of drugs that influence intellectual competence. I am not greatly alarmed about any of the possible outcomes of either of these two experiments. I believe there should be

the maximum availability of whatever resources we have that can augment man's most human attributes for the use of his own intelligence and cooperativeness with other individuals.

There is a "what if," though, that we didn't raise concerning, particularly, some of the drugs that have already been investigated, namely, their hazards. It seems to me very unlikely that we are going to have it so easy that a chemical will be found that will improve intelligence and will have an unambiguously favorable effect or a neutral effect on every other aspect of human performance. In fact, there are some individuals in whom the very increase of intelligence represents a hazard, sometimes even to themselves. But that is not quite what I had in mind. I think any drug that has this kind of effect on the central nervous system will almost certainly have a risk attached to it for some individuals. We then face the nice question, Is an increase in humanity, a general increase in IQ, worth taking some risk with respect to the performance of this individual?

I would like to make a general remark on the whole issue of medical experimentation. I think the law is properly alarmed at a situation where individuals face the risk of becoming "bamboozled" into giving up, without evidence of appropriate consideration, an important value, namely, their life or health. And this is why, of course, one has to be so touchy about informed consent because it seems unreasonable to expect that an uncompensated individual or an individual whose compensation is ambiguous will in fact respond so altruistically. The law is suspicious of altruists and properly so. I have an answer that I think deserves to be explored. Then why don't we pay medical volunteers? Why don't we establish some level of compensation for risks incurred in the same way that, to a degree, we pay firemen and policemen because of the risk they take on our

\* Since the Colloquium was held, Dr. Lederberg has accepted an appointment to the National Institute of Mental Health Council.

behalf in their hazardous occupations? To a certain extent we grossly underpay them; we even pay our servicemen for the risks that they undertake on our behalf in military engagements. You may think that this would be an economic burden that we cannot afford to pay. But if we paid medical volunteers at actuarially sound rates and if we bought insurance against the hazards that might accrue to them, this could only have a humane effect. I think we should consider the whole question of whether, if there has been an ample exchange of information between the physician or the hospital and the subject of research, we would not have a much better precedent and an understanding that a fair contract had been made. I would like to open this question for legal and lay consideration.

JUDGE BURGER: There is historical precedent, as I suggested earlier; for lawyers, you know, can always find precedents for something cushioning the unhappy consequences of medical research. A couple of hundred years ago people who worked in the mills and the mines were subject to what was called the "doctrine of assumption of risk." They took the risk, and if they got killed or maimed, they were on their own and often went to the county poorhouse whether it was in England or in early America. Dr. Lederberg has suggested money payment for taking the risk. Perhaps this should not be compensation in terms of paying a subject for undergoing the experiment but rather in terms of providing a broad-based fund, financed in any one of a dozen ways and geared to the NIH grants for medical research, by which the victim of the unsuccessful experiment—the person who is maimed or injured or killed—is covered just as is a coal miner or another workman who is paid a compensation when he is injured, without reference to negligence. This would take this whole area of experimental medicine out of the realm of negli-

gence and malpractice. This is a possibility that some of your fertile-minded medico-legal people might do well to think about.

PROF. KRECH: In the first place, we do have a precedent. We have a fund now, do we not, for the victims of a poor experiment—our economic society; this fund is called "social security." But that is not what I really wanted to discuss. I want to go back to Dr. Lederberg and his unhappiness at the applause he drew. I think I know, Dr. Lederberg, what was wrong with your statement that drew the applause. It was your easy distinction (which I find very difficult or impossible to make) between "social control" and "individual conscience." I think that there is nothing so socially determined as a man's private conscience. Now, one speaks of the doctor's "personal" conscience and his attitude towards his patient. But these very attitudes and ethics were built up from the doctor's very first day of medical school. He was *taught* what were the "correct" attitudes. The doctor's "individual conscience" was very much socially shaped and is very much socially controlled. There are various ways of socially controlling the basic researcher also. What do we teach our research people? Do we teach them to seek truth for its own sake and to pay no attention to the effects of our research on society? Do we teach them that society will somehow take care of the effects and that it is none of the scientist's business anyway? He must merely discover the truth? If we teach that, then we are inducing one set of social attitudes or personal conscience or "scientific ethics." But this is a set of attitudes that I find, at this stage of the game, to be medieval at best. Another position would be deliberately to teach the basic researcher that when he goes into the laboratory he continues to carry with him all of his social responsibilities. When he takes off his "civilian" coat and puts on a laboratory coat he does not shed these responsibilities. If we taught him

this, as deliberately as the medical student is taught his ethics, we would produce scientists with a different (and in my opinion, a better) set of "personal" values. That is one form of using social control—inducing the proper attitudes. Let me now mention another kind of social control. We all apply for money from the federal agencies. Money has been the greatest invention for the promotion of research in the last 30 or 40 years—government money. And who gets the government money? Obviously someone makes decisions about that, and his decisions are not based purely on chance. This is another area of social control that has been made without much thought. Perhaps we should do some thinking about this form of social control, too. But in any event, Dr. Lederberg, I fail to see the distinction between "an appeal to conscience" and an "imposition of social control"—a distinction that, when you merely stated it, brought down the house with approving applause.

DR. ELKINTON: I can't quite let Sir Peter and Dr. Dubos go unchallenged over their delineation of moral standards as shifting sands without making a comment. And I think that this comment applies both to individual morality and to social morality. It seems to me that what we have been talking about, and what we all are interested in, is enhancing the potential *quality* of human life. This is so whether we are talking about the human life of one experimental subject or one patient or a whole population. Perhaps we have acquired *some* wisdom down through the ages from outside the boundaries of science—wisdom as to what constitutes, and what kind of action leads to, goodness, truth, and beauty in human life. At the core of this wisdom lies the general concept that to care for oneself alone is not as likely to enhance the quality of one's own life as is activity directed outside oneself, that is, care and consideration for the quality of life of others. These are

moral insights that we tend to look on as old-fashioned but that I think we cannot write off entirely. Let us realize that, as our knowledge and insights accumulate in both science and the humanities, we should be much better able to predict what actions on our part, as individuals or as a society, are going to affect the quality of life of that as yet unborn fetus or of that over-expanding population in an underprivileged country. I do believe that there is an absolute common denominator underlying our moral judgments, namely, concern for the quality and dignity of human life.

PROF. STUMPF: In that connection I want to comment on the distinction that Dr. Dubos made between individual morality on the one hand and statistical morality on the other. I think I saw the spirit in which he said this, but I genuinely feel that this is an artificial distinction because, in the last analysis, when you talk about the greatest good for the greatest number, you are still left with the question, In the name of what is this called a good for anyone? It has to be defined as a good for someone in order to be a good for many. I am sure you recall that this was a nineteenth century philosophy that was worked out mathematically by Jeremy Bentham and later on by John Stuart Mill. This is the utilitarian philosophy, and it usually is stated in terms of the greatest happiness for the greatest number. Then you have to define what you really mean by happiness. So finally you are driven back to some interpretation of what it means to be a human being and what is good for each individual. And in this sense I have some concern with your stating that probably we should have had a theologian speaking here today and at the same time saying there are no moral absolutes. This in itself is rather an interesting combination of ideas primarily because I think that we are not all that much in the dark regarding morality, whether it be individual or social.

My comments are made on the assumption that there are at least three virtually universal and permanent values. The first major value is truth telling and, with it, everything that is involved with respect to what we think of another person. I remind you that the possibility of a lie depends on giving the impression that you are telling the truth. It's a rather interesting point—you can't lie unless you affirm the value of truth. The second permanent value is expressed in the saying that we ought not to willfully injure someone; the third is that we should not take what is another man's. And this, of course, is especially pertinent to our discussion here today, for what belongs to a person more than himself—his body and his consciousness?

I want to underscore your comment—which bears on many other comments here—that medicine is not autonomous. This is the moral point I would want to make. I think the drift of the discussion, the drift of your comments particularly as well as of mine, is that science will not generate its own values, that somehow we have to bring to them the consciousness and deliberate power of the human mind. I feel much happier in dealing with simple moral insights than with a system for the reason that you mentioned, namely, that there is a shifting complexion to our problem as we get more information. I take it that one of the reasons for the Vatican Council is to discover ways of getting out of the box formed by absolutes, or getting out of a commitment to a certain formulation of an absolute. I believe in some absolutes and I think you do too, but I think that what we feel uncomfortable with are absolute inferences from these absolutes.

SIR PETER MEDAWAR: I wanted to make a comment on Dr. Elkinton's point: his warning that we must not make too much of the changing standards of morality. Certainly we cannot neglect what one might call traditional, immemorial wisdom. I do

indeed agree with him. I think we ought to remember traditional wisdom more often than we do when we strike moral attitudes about problems like the problem of abortion. The fact is, we do treat the fetus quite differently from the way we treat the newborn child. For we don't in fact baptize miscarriages; we don't in fact hold funeral services for them. We do not regard every menstruation as a culpable deprivation of human life. I think that over matters like this we should revert to a traditional and common-sense morality that does in fact make a distinction between the fetus—particularly the early fetus—and the newborn child.

DR. MCDERMOTT: I shall now proceed to close. Interestingly enough, particularly in this last three quarters of an hour, there has been a very constant thread running through the discussion to the effect, first, that morals are a reflection of culture, that culture is in constant evolution, that one cannot have laws until the attitudes of the society are there to back up the laws, and that there is something called a public good. Whether that public good is no more than the sum of the individuals "goods" is a point that Prof. Stumpf and I could hire a hall and debate. But this is obviously a public good of some sort for, if there are no social priorities, there is no ethical justification for clinical investigation or other biomedical research that conceivably might put an individual at risk. So much for this common thread. But above all, I return to a comment made by Prof. Lederberg at the beginning that struck me as being really the text of our Colloquium today. His phrase, "known the pain of the consequences of his actions," is the text that is running through everything that everyone has been speaking about. And our problem is that today we are so very much more able to see this linkage between our actions and their consequences that we can never really free our-

selves from anguish whether we act or choose not to act. I am convinced that it is this that has given rise to this extraordinarily fine presentation this morning for which, on behalf of us all, I wish to thank the participants very much.

DR. WRIGHT: On behalf of the American College of Physicians I should like to extend our deep gratitude to those who have contributed so generously to this remarkable intellectual experience. Thank you all very much.

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